counter segments, said individual segments and counter segments confronting with each other with an LCD material therebetween;

a two or more time-division dynamic LCD drive for driving the LCD display by applying controlled drive voltages to a selected one each of the common and segment terminals, and

a controller including dormancy determining means for selecting within a single frame period at least one predetermined dormant period T0 for which the voltage between all common and segment terminals is zero [or close to zero].

REMARKS

Claims 2-7 are pending in the application. Claim 2 has been amended.

In the Office Action, the drawings were objected to because Figs. 2 and 3 lack a designation as prior art. Submitted herewith are proposed drawing corrections to Figs. 2 and 3 to properly label them as prior art. Applicant believes that this amendment is fully responsive to the Examiner's concerns.

Claims 2-7 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,218,352 (Endoh). This rejection is respectfully traversed. Applicant respectfully requests reconsideration and allowance of the claims in view of the following arguments.

Regarding the rejection of independent claim 2 based on Endoh, this reference discloses that a display density of an LCD can be varied by switching between a first duty ratio and a second duty ratio. In contrast, the invention of claim 2 controls an LCD's display density by providing a time period for which the same voltage (i.e., zero) is output to all common terminals and all segment terminals of the LCD display. This is accomplished, for example, via a counter for counting numerical values. Thus, while both Endoh and the claimed invention adjust display

density, they accomplish that function in completely different ways using different structures. Claim 2 has been amended for clarity to recite that the voltage between the common and segment terminals during the dormant period T0 is zero.

To compare the present invention and Endoh, if the duty ratio is switched as taught by Endoh, in the case of 1/3 bias, the amplitude of the difference voltage between the common terminals (COM) and the segment terminals (SEG) of the LCD in the dormant period is 2/3 V_{LCD}. On the other hand, in the case of 1/2 bias as in the embodiment of the present invention discussed at pages 4-6 of the application, the amplitude of the difference voltage between COM and SEG in the dormant period is V_{LCD} (V_{DD}=V_{LCD}).

If V_{DD}=V_{LCD}=4.4V, 1/2 bias and 1/4 duty, the effective voltage applied to the unlighted segment is $V_{4OFF}(0)$=1.9V, and the effective voltage applied to the lighted segment is $V_{4ON}(0)$=2.91V.

When the duty ratio is changed as taught by Endoh to to reduce the display density; for example, to 1/2 bias and 1/6 duty, the effective voltage applied to the unlighted segment is $V_{6OFF}(0)$=2.01V, and the effective voltaged applied to the lighted segment is $V_{6ON}(0)$=2.69V. As seen from the above calculations, $V_{6OFF}(0)$ is larger than $V_{4OFF}(0)$. This means that the unlighted segment is slightly visible, depending on the viewing angle and temperature. However, $V_{6ON}(0)$ is lower than $V_{4ON}(0)$ by only 0.22V. Thus, the display density is not significantly reduced using Endoh's technique.

In contrast, according to the claimed invention, during the period 2T, the amplitude of the difference voltage is made to be 0V by the claimed controller. As calculated from the equation at page 5, line 24 of the application, the effective voltage applied to the unlighted segment is $V_{4OFF}(2)$=1.56V; and the effective voltage applied to the lighted segment is $V_{4ON}(2)$=2.38V.

Thus, $V_{4OFF}(2)$ is considerably lower than $V_{4OFF}(0)$. This means that the unlighed segment is less visible using the inventive device, regardless of the viewing angle and temperature. Furthermore, since $V_{4ON}(2)$ is considerably lower than $V_{4ON}(0)$, the display density is considerably reduced using the present invention.

Endoh does not render the invention of independent claim 2 obvious, because it does not teach or suggest the recited controller having dormancy determining means for selecting, within a single frame period, at least one predetermined dormant period T0 for which the voltage between all common and segment terminals is zero. Moreover, it would not have been obvious to modify Endoh to add the controller of claim 2. As discussed above, Endoh accomplishes its goal of varying display density in a completely different way than the claimed invention. Therefore, one skilled in the art would not have been motivated to modify Endoh with the claimed controller to yield the invention of independent claim 2.

Consequently, claim 2 is patentable, as are claims 3-7, which depend from claim 2.

Reconsideration and withdrawal of the rejection of claims 2-7 under 35 U.S.C. §103(a) are respectfully requested.

Accordingly, it is believed that all pending claims are now in condition for allowance. Applicant therefore respectfully requests an early and favorable reconsideration and allowance of this application. If there are any outstanding issues which might be resolved by an interview or an Examiner's amendment, the Examiner is invited to call Applicant's representative at the telephone number shown below.

To the extent necessary, if any, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted

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